Remarks

Applicant would like to thank the Examiner for the thorough Office Action that covered in depth the drawings, the specification and the claims. Applicants have with this response attempted to be responsive to each issue raised in the Office Action. Thus there is submitted corrected drawings, amendments to the specification and amendments to the claims. These are all submitted with the intent to overcome the objections raised by the Examiner and to place the application in condition for an allowance. The Examiner is asked to reconsider this application and issue a favorable response.

This Response is being filed within two month following the due date and is accompanied with a Petition for an extension of time and a payment of the fee for a small business. If any additional payment is required, this is authorization to charge any such amounts against the undersigned's deposit account 042350.

First, in reviewing the specification it became apparent that a mix-up existed in referring to the drawings. In the section of the specification headed "BRIEF DESCRIPTION OF THE DRAWINGS" that appears starting at page 14 there is reference to nine figure. A search through the rest of the application shows that at no time thereafter is there a reference to Figure 8. Further there is thereafter a reference to a Figure 10 that does not appear in the DESCRIPTION OF THE DRAWINGS. On further review of the text it becomes apparent that the reference to Figure 9 should have been to Figure 8 and the reference to Figure 10 should have been to Figure 9. These have now been corrected in the specification at pages 33 and 34 (see above in the section of this Response headed Amendments to the Specification). With this correction a number of the issues raised about not finding numbers listed in the specification in the appropriate drawings have been rectified. Specifically, in the action it was pointed out that 120 was missing in Figure 9. In fact the reference should have been to Figure 8 and thus this

correction in identifying the proper drawing does away with this objection concerning 120. It now appears as a number in Figure 8 and it appears in the drawings of Figure 8. This also clarifies that the number 199 in the specification should have read 119 since 119 appears in Figure 8 and 199 does not otherwise appear. This is now corrected in the specification.

As required by §1.84 submitted herewith are sheets of drawings identified as Replacement Sheets and as Annotated Sheets. The Annotated Sheets show corrections in red and the Replacement Sheets are clean copies of pages 2/8, 4/8, 5/8, 6/8 and 8/8. No changes were made on the other sheets of drawings. The changes made to the drawings do not add new matter. Instead, the changes have been made to clarify and make corrections to the original drawings.

The drawings have been corrected with the submission herewith of Annotated Sheets of drawings showing in red the corrections made and Replacement Sheets to enter the correct drawings into the application. Modifications have been made as suggested by the Examiner and in a few additional instances in connection with errors in the drawings uncovered following the careful review suggested by the Examiner. The corrections are described in the following. In Figure 2 two numbers have been corrected. 34 is changed to 36 and the upper appearance of 48 has been changed to 45. These were both noted for correction by the Examiner. In Figure 4 the second appearance of 66A has been changed to 66B. This was an error in the original drawing noted by applicants. In Figure 5 the reference number 84 has been removed and 34 has been added. Again this was noted by applicants on review. In Figure 6, 32B and 32C and 33B and 33C have been added for consistency and in connection with their parenthetical listing on page 26 line 22 of the specification. In addition and in accordance with the mention at page 27 line 21 the numbers 34A-D are inserted. This conforms the drawing to the specification and does so by inserting numbers for features identified in other figures. In addition Figures 8 has been corrected by including missing items 122 121 and points 121A, 121B and 121C. Also the location of T_1 has been edited and T_2 and T_3 have been added. Figure 9 has been corrected by identifying the dotted vertical lines as

X and Y and the distance between these lines by adding the expression X-Y between arrows along the time line. Finally, the prior inclusion of T_{FGOFI} has been corrected to T_{FGOI}. In connection with these changes to Figures 8 and 9 some have been made to match the drawings to the specification and in some cases additional wording identifying an item has been added to the specification. See above the paragraph appearing at page 33, line 18 for the additions. The additions made follow from the disclosure of the specification and to clarify items of these drawings. It is again submitted that no new matter has been added and the Examiner is requested to enter these drawings into this application.

Responding to the objections to the specification raised by the Examiner in the order in which these appear, a correction has been made to the spelling of "O-ring" in the paragraphs that start on pages 21 and 22. Also the term "an or" has been corrected to "a" in the paragraph that starts on page 22 at line 27. The number 36 has been corrected to 33 in the paragraph starting at page 23 line 28. In this same paragraph toward the end, the number 42 has been corrected to 32. The correct spelling of O-ring has been inserted into the paragraph starting at line 14 of page 24.

At page 33 in the paragraph starting at line 18, Figure 9 has been corrected to Figure 8 and reference numeral 199 has been changed to 119. Finally at the end of the paragraph at line 27 of page 34, the number "10" has been changed to "9". It is believed that these responses all are responsive to the objections set forth in the section identified as 9 in the Action of 09/08/2003.

The claims have also been amended to overcome the objections set forth in the section identified at 10 on page 6 of the Office Action except for those objections set forth for claims 18 and 29 since each of these is a non-elected claim that stands withdrawn by the Examiner by the recent Office Action. If it is intended to change the groupings and have claims 18 and 29 prosecuted with the other elected claims, applicants would be pleased to respond in connection with each of these claims.

In claim 19 "of interest" has been deleted. In addition applicants have inserted words of clarification into this claim. In particular, the claim now provides that the method of this invention is that of determining the gas transmission rate through a barrier material. In addition there is provided as a step in the claim that of determining gas transmission by partial pressure readings to specify the permeability of the material. All other claims being prosecuted are dependent claims and all now include these limitations present in claim 19.

The Examiner has rejected claims 19, 20 and 28 as obvious over Lucero in view of Tou. In this connection the Examiner set forth steps of claim 19 and concluded that these are taught by Lucero except for the mass spectrometer and that such an instrument is taught by Tou. It is suggested, as will be discussed below, that a more careful review shows that the instant invention should be found inventive over Lucero and that the combination with Tou does not make this invention obvious.

The present invention has as its objective that of determining the transmission characteristics of a barrier material. This will vary depending on the gas used in testing. For this reason another way to state an objective and purpose of the present invention is to establish the gas permeability characteristics of a barrier material. The invention is intended for use in industries where the accuracy of permeability determinations is crucial to the operation of sophisticated instrumentation or elements. For example an important usage is to measure the permeability of barrier materials for light emitting diodes, or for field emission displays and also for flat panel displays. Another application is that of packaging materials for the food industry. As described in the application, as set forth in accepted references in this field, the finest modern day commercial equipment can only measure permeability of a barrier material for water at approximately $10^{-3}g/m^2/day$; however, today's requirements are for measurements at the level of $10^{-6}g/m^2/day$ for water and $10^{-6}cc/m^2/day$ for oxygen, generally at a sensitivity level about a thousand times or more sensitive than the best available systems today. Additionally

measurements are made with greater speed than has heretofore been possible and techniques to correlate permeability of barrier materials to other gases on an absolute scale are defined. Various advantages of this invention are set forth in the specification.

Lucero on the other-hand, although it includes certain steps followed in applicants' invention, is interested in gas analysis not in measuring the permeability of barrier materials. This distinction from Lucero, as the claims are presently amended, is now quite clear. Lucero has other weaknesses as support for the proposition advanced by the Examiner. In particular, Lucero uses a semi-permeable membrane as a filter for dilution of an unknown gas to be detected, not as a barrier sample with unknown characteristics under test (see Col. 1, lines 61-68). Further the layers to be tested according to the instant invention do not obey Fick's Law but rather are defect limited. In Lucero, which follows Fick's Law, a vacuum is drawn in the measurement chamber for the purpose of removal of residual gas or contaminants only and not for controlling the partial pressure of the barrier test gas (see Col. 7. Lines 39-54 for example of Lucero).

Although Tou mentions the use of a mass spectrometer, the mass spectrometer in Tou acts only as a gas analyzer. Also Tou teaches the use of an interface (see Fig. 1), e.g., a capillary conductance limiting hollow fiber between the sample at atmospheric pressure and the mass spectrometer detector under vacuum. The instant invention does not use conductance limiting or an interface to buffer the mass spectrometer. And, of course it is not intended to claim mass spectrometers are new to applicants. (Tou (4,944,180) is cited and discussed in the instant specification. See the last line on page 5.)

In the final paragraph on page 7 of the rejection the Examiner states "controlling gas concentration in test chamber by using a vacuum pump" is obvious to one of ordinary skill. The present invention however, uses the unique and nonobvious method of balancing the flow rate (controlled by a mass flow controller) with the pumping speed of a vacuum pump. Further this invention uses vacuum pumping to achieve dynamic

conditions on both sides of the barrier film under test (see for example page 8 the paragraph starting at line 15, page 19 the paragraph starting at line 26). Lucero does not teach such an approach.

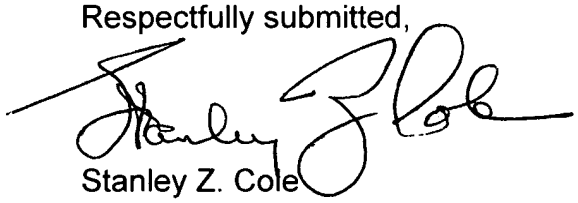
With respect to the comments by the Examiner in the final paragraph appearing at page 7 of the Office Action, in which he indicates that "limitation of pressurizing the chamber to a specific value" is obvious, it is pointed out that a simple static value is not set in accordance with the present invention. Instead a dynamic condition is employed which is scaled to the quality of the barrier under test, in the sampling area, the vacuum integrity of the test chamber and other factors. Also the "set point" is based on establishing a pressure differential on the sensor side of the barrier that provides adequate gas by diffusion to allow detection by the mass spectrometer but not too high a value for this could saturate or even damage the mass spectrometer. In fact, a "denser material may not require a stronger vacuum in order to make the testing process less time consuming" as suggested by the Examiner. A "denser material", i.e., a better barrier will require a "weaker vacuum", i.e., a higher test gas pressure to achieve adequate partial pressure on the sensor side to permit proper detection by the mass spectrometer. This it is suggested is counterintuitive and not obvious. It is therefore respectfully submitted that claim 19 is allowable over the combination of Lucero and Tou. Further since all of the remaining claims are dependent on claim 19 and all have the same, as well as additional manipulations, all are distinct from and allowable over the rejection using Lucero and Tou.

The Examiner has suggested in respect to claim 20, that an operator would normally be required to check the calibration of a mass spectrometer, and this would allow the gathering of accurate measurement information. However, this surely is not suggestive of a system that provides an absolute measurement with traceability to NIST as is described in the instant application and in this claim .

The Examiner has noted that the prior art does not make claims 21- 27 obvious and thus these claims in independent form should be allowable. Applicants ask for reconsideration of the rejection of claims 19 and 20 in view of the presentation above which it is submitted establishes that these two claims are also not obvious in view of the art and should be allowable over this art. On this basis all claims pending in this application in prosecution should be allowable. If for any reason the rejection of any of the claims continues however, the Examiner is requested to permit the submission of dependent claims 21-27 in independent form for them to be allowed.

Errors in the specification, the drawings and the claims have now been corrected. Amendments have been made to the claims and it is believed that it has been shown that the claims define an invention over the art. The claims being proper in form and substance, a Notice of Allowance is respectfully solicited.

Respectfully submitted,



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